

Component A1

Geographic Region: North of Lake Okeechobee

Component Title: Storage Reservoir (same as Alternative 1)

Purpose: Storage reservoir to provide flood attenuation, estuary flow protection, and water supply benefits.

Operation: Inflows from Lake Okeechobee to be pumped into reservoir when the Lake stage is rising and is greater than 0.4 feet below the pulse zone of the current regulation schedule. Releases will be made back to the Lake when the Lake stage is falling and is at least 0.5 feet below the bottom pulse zone.

Design:

20,000 acres at 10 feet maximum depth

Inflow pump capacity = 4800 cfs

Outflow structure = 4,800 cfs

Location: To Be Determined – Specific site not necessary for Water Management Model simulation

Counties: Glades, Highlands, Okeechobee, Osceola, and Polk

Assumptions and related considerations:

(1) Uncertainty in land availability

(2) An alternative to capturing Lake water would be to attenuate flood waters before reaching the Lake. This could be done north of the Kissimmee River which could have positive impacts to the Kissimmee River Restoration Project or within the Taylor Creek/Nubin Slough which would improve water quality entering the lake.

(3) Potential increase in stage duration of Lake Okeechobee.

(4) Potential decrease in maximum stages of Lake Okeechobee

Component B2

Geographic Region: St. Lucie/C-44 Basin

Component Title: Storage Reservoir (same as Alternative 1 with the exception the size of the Storage Reservoir)

Purpose: Storage reservoir to capture local runoff from C-44. The reservoir will be designed for flood flow attenuation to the estuary, water supply benefits including environmental water supply deliveries to the estuary, and water quality benefits to reduce salinity and nutrient impacts of runoff to the estuary.

Operation:

Inflows from C-44 basin runoff (and only when Lake stage is > 14.5 ft)

Inflows from Lake regulation discharges if capacity exists

Design:

10,000 acres at 4 feet maximum depth

Inflow pump capacity = TBD (initially assumed to not constrain performance)

Outflow structure capacity = TBD (initially assumed to not constrain performance)

Location: To be determined – Specific site not necessary for Water Management Model simulation

Counties: Martin

Assumptions and related considerations:

(1) Uncertainty in land availability

(2) Potential water quality benefits by reducing nutrient loading to the estuary

Component C1

Geographic Region: St. Lucie/C-44 Basin

Component Title: Environmental Water Supply Deliveries to St. Lucie Estuary
(same as Alternative 1)

Purpose: To provide freshwater flow to the St. Lucie Estuary to protect and restore more natural estuarine condition.

Operation: Deliver estuary target discharge through S-80 from the storage reservoir when water is available or from the Lake when the Lake stage exceeds 15 feet.

Design: Operational change only

Location: C-44 and St. Lucie Estuary

Assumptions and related considerations:

(1) Target Estuary delivery based on maintaining salinity conditions in the estuary to support Oyster community

Component D2

Geographic Region: Caloosahatchee/C-43 Basin

Component Title: Storage Reservoir(s) with Aquifer Storage and Recovery (ASR)
(same as Alternative 1 with the exception of adding ASR)

Purpose: Storage reservoir(s) with ASR to capture basin runoff and releases from Lake Okeechobee. These facilities will be designed for water supply benefits, some flood attenuation, and to provide base flows to the Caloosahatchee estuary.

Operation: Inflows from Lake Okeechobee regulatory discharges and runoff from C-43 basin will be captured by both the reservoir(s) and ASR wellfields simultaneously. ASR wellfields will continue capture excess water even after reservoir(s) are full. Water from reservoir(s) will be used to supplement irrigation demands from Lake Okeechobee and provide water supply deliveries to the Caloosahatchee estuary when lake stages are below 15.00 feet NGVD (Caloosahatchee estuary demands are met from Lake Okeechobee when lake stages are above 15.00 feet NGVD). The ASR facilities will also be used to supplement irrigation demands but have a priority of meeting minimum flows to the Caloosahatchee estuary during times when Lake Okeechobee stages are below 15.00 feet NGVD.

Design:

Reservoir(s) total of 20,000 acres at 8 feet maximum depth.
ASR wellfields total of 22 10-MGD wells

Reservoir(s) Inflow pump capacity = TBD (assumed not to constrain performance)
ASR inflow capacity = limited to 220 MGD
Reservoir(s) outflow structure capacity = TBD (assumed not to constrain performance)
ASR outflow capacity = limited to 220 MGD

Location: TBD - Specific site not necessary for simulations

Counties: Hendry, Glades, Lee

Assumptions and related considerations:

- 1) Uncertainty in land availability.
- 2) Potential water quality benefits by reducing nutrient loading.
- 3) Raw water ASR injection permittable.
- 4) 70 percent recovery for injected ASR water.

- 5) Size of injection bubble not limited.
- 6) ASR facility sized to slightly exceed minimum flows to estuary.

Component E1

Geographic Region: Caloosahatchee/C-43 Basin

Component Title: Environmental Water Supply Deliveries to Caloosahatchee Estuary (same as Alternative 1)

Purpose: To provide freshwater deliveries to the Caloosahatchee Estuary to establish desirable salinity at locations of key estuarine biota.

Operation: Deliver desired estuary target flow through S-79 from the storage reservoir when water is available or from the Lake when the Lake stage exceeds 15 feet.

Design: Operational change only

Location: C-43 and Caloosahatchee Estuary

Assumptions and related considerations:

(1) Estuary deliveries based on maintaining salinity conditions in the estuary to support a range of aquatic vegetation seagrass, invertebrates, and fish communities.

Component F1

Geographic Region: Lake Okeechobee

Component Title: Lake Okeechobee Regulation Schedule (same as Alternative 1)

Purpose: Operating criteria for Lake Okeechobee that includes flood control, water supply (including releases to the Water Conservation Areas to meet estimated natural system needs), and Lake littoral zone and estuary protection.

Operation: Use current regulation schedule (known as Run 25) with the exception of eliminating all St. Lucie regulatory discharges (except emergency releases - zone A).

Design: Operational change only. Modify the regulation schedule by eliminating all but emergency discharges to the St. Lucie Estuary.

Location: Within existing boundary of Lake Okeechobee
Counties: Glades, Hendry, Martin, Okeechobee, and Palm Beach

Assumptions and related considerations:

(1) It is assumed that the implementation of other project components will reduce the frequency of high Lake stage events therefore reducing the need for regulatory releases to the St. Lucie estuary.

Component G2

Geographic Region: Everglades Agricultural Area (EAA)

Component Title: Storage Reservoir (same as Alternative 1 with the exception of increased conveyance from Lake Okeechobee to the Storage Reservoir)

Purpose: Storage reservoir to: improve timing of environmental deliveries to the Water Conservation Areas including reducing damaging flood releases from the EAA to the Water Conservation Areas; reduce Lake Okeechobee regulatory releases to estuaries; to meet supplemental agricultural irrigation demands; and increase flood protection within the Everglades Agricultural Area. Conveyance capacity of the Miami and North New River Canals between Lake Okeechobee and the Storage Reservoirs are increased to convey additional Lake Okeechobee flood control releases that would have otherwise been discharged to the Caloosahatchee and St. Lucie Estuaries.

Operation: Inflows from Lake Okeechobee regulatory discharges and runoff from Miami & North New River canal basins. Reservoir will be primary source for meeting both Everglades Agricultural Area (Miami, North New River, and Hillsboro canal basins) supplemental irrigation demands, and the needs of the Water Conservation Areas and Everglades National Park. When the reservoir depth falls below 0.5 feet, Lake Okeechobee is used for meeting these demands. The flows will be delivered to the Water Conservation Areas through STA-3 and 4.

Design:

40,000 acres at 6 feet maximum depth

Inflow pump capacity = 2700 cfs Miami Canal Basin and 2300 cfs North New River Canal Basin

Outflow structure capacity:

To Stormwater Treatment Area 3&4: 3600 cfs @ 6 ft head.

To EAA: TBD (initially assumed to not constrain performance)

Increase in Miami & North New River Canal capacities (100%)

Location: To be determined - conceptually located between Miami & North New River Canals for Water Management Model simulation purposes only.

Counties: Palm Beach

Assumptions and related considerations:

(1) Land Availability

(2) Modifications to Stormwater Treatment Areas if needed for Everglades water deliveries to meet the appropriate water quality.

Component H1

Geographic Region: Water Conservation Areas and Everglades National Park

Component Title: Everglades Rain-Driven Operations (same as Alternative 1)

Purpose: Improve timing and location of water depths in the Water Conservation Areas and Everglades National Park.

Operation: Rainfall-driven operational rules with NSM-like hydrologic conditions triggering deliveries to the Water Conservation Areas, between the Water Conservation Areas, and to Everglades National Park. ***These rules are the same as those used in Alternative 5 of the Lower East Coast Regional Water Supply Plan.***

Design: Water will be delivered through the Stormwater Treatment Areas prior to entering the Water Conservation Areas and will be distributed to improve hydropatterns. Flows to Everglades National Park will be through water control structures along Tamiami Trail (S-12s, S-333, and S-355 structures).

Location: Within the existing boundaries of the Water Conservation Areas and Everglades National Park.

Counties: Broward, Dade, Monroe, and Palm Beach

Assumptions and related considerations:

- (1) Consideration given to tree islands and minimum floor levels consistent with SFWMD's proposed minimum flows and levels for these areas.
- (2) Potential increase in hydropatterns in dry areas and decrease in hydropatterns in deep water areas.

Component I1

Geographic Region: Water Conservation Areas and Everglades National Park

Component Title: Improved Conveyance between Water Conservation Area 3B and Everglades National Park (same as Alternative 1)

Purpose: Improve water deliveries to Everglades National Park from Water Conservation Area 3B by increasing conveyance capacity through L-29 and US Highway 41 (Tamiami Trail).

Operation: Increase conveyance by adding two additional S-355 structures along L-29 below Water Conservation Area 3B and elevating or bridging portions of US Highway 41 (Tamiami Trail). Elevating or bridging the Trail will remove water level constraints allowing greater conveyance into Everglades National Park. The structures would be operated consistent with Everglades Rain-Driven Operations component.

Design:

(1) Two additional 1,000 cfs structures identical to the S-355 structures proposed as part of the Modified Water Deliveries Project. This would increase conveyance capacity from 2,000 to 4,000 cfs.

(2) Raise Tamiami Trail by bridging and elevating portions of the Trail below Water Conservation Area 3B.

Location: Within the existing boundaries of the Water Conservation Areas and Everglades National Park.

Counties: Dade, Monroe

Component J

(not included in Alternative 2)

Component K2

Geographic Region: Water Preserve Area - Palm Beach County

Component Title: L-8 Project (modified from Alternative 1 to capture additional water and improve stages in the West Palm Beach Water Catchment Area) -- SEE COMPONENT MAP 1

Purpose: Reduce water supply restrictions in the Northern Palm Beach County Service Area by capturing more of the annual discharges from portions of the southern L-8, C-51 and C-17 basins and route this water to the West Palm Beach Water Catchment Area. Intent is to increase water supply availability and provide pass through flow to enhance hydroperiods in Loxahatchee Slough and increase base flows to the Northwest Fork of the Loxahatchee River.

Operation: Capture excess L-8, C-51 and C-17 basin water to meet urban water supply demands in the Northern Palm Beach County Service Area and enhance hydroperiods in the Loxahatchee Slough. Water would be diverted through the M-canal to the Water Catchment Area. Stormwater treatment areas will be provided to meet all water quality standards required if necessary.

Design:

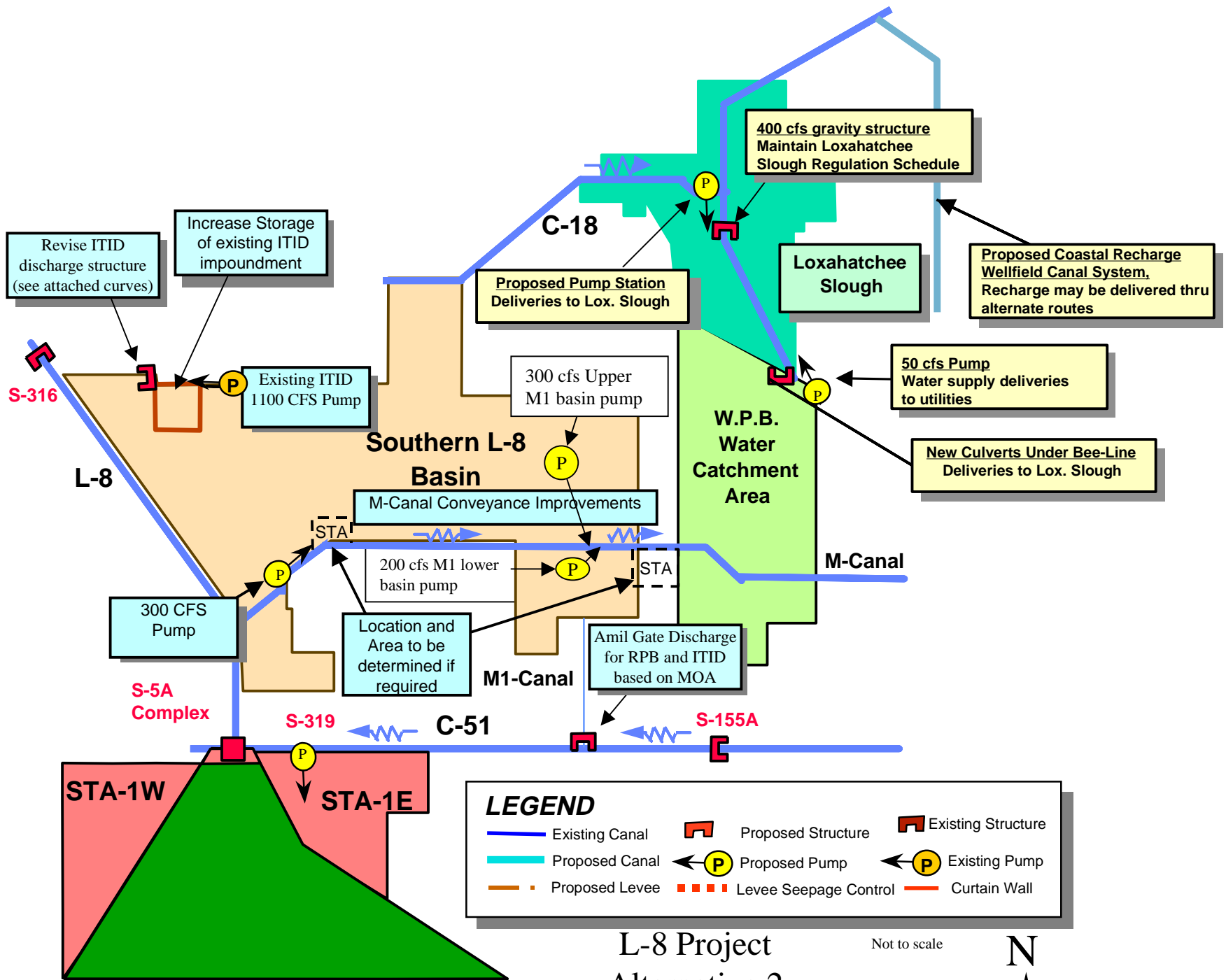
- Increase the pumping capacity from the L-8 Tieback into the M-Canal to 300 cfs to increase the volume of water captured from the southern L-8 canal and deliver it to the Water Catchment Area. This pump has dual purpose, 1) to capture L-8 basin runoff when available and 2) to deliver regional deliveries when needed.
- Assume that the Indian Trail Improvement District will adopt an operation plan which promotes water conservation by prioritizing discharge so that excess storm water is first offered to the City of West Palm Beach Water Catchment Area and secondarily discharged through off peak releases to the C-51 Canal via the M-1 Canal. For this alternative pumping from Indian Trail Improvement District into the M-Canal for subsequent discharge into the City of West Palm Beach Water Catchment Area will be assumed to occur under the following conditions
 - When the City of West Palm Beach Water Catchment Area has sufficient need for imported water as defined by being below 18.2 feet NGVD.
 - When water levels in the Lower M-1 Basin exceed 14.0 feet NGVD during the wet season (June 1 through October 31) or 16.0 feet NGVD during the dry season (November 1 through May 31) the Lower M-1 Basin may discharge up to 200 cfs for subsequent storage.
 - When water levels in the Upper M-1 Basin exceed 15.0 feet NGVD during the wet season or 16.0 feet NGVD during the dry season) the Upper M-1 Basin may discharge up to 300 cfs for subsequent storage.

- Increase conveyance of the M-canal between the pump and the Water Catchment Area to accommodate the increased inflow from the L-8 Canal and the Indian Trail Improvement District.
- Install a new structure in the south leg of C-18 just south of the west leg to facilitate better management of water levels and discharges from the Loxahatchee Slough. The new gravity structure would consist of a variable discharge up to 400 cfs and emergency overflow weirs.
- 50 cfs pump for water supply deliveries to utilities.
- New culverts under Bee-Line Highway for up to 100 cfs deliveries to Loxahatchee Slough.
- Eliminate ASR component described in the Future Without Project Condition

Location: Southern L-8 Basin including the Indian Trail Improvement District, West Palm Beach Water Catchment Area, and the Loxahatchee Slough
 Counties: Palm Beach

Assumptions and related considerations:

- (1) Should help maintain stages in the Loxahatchee Slough and reduce high discharges to the south west fork of the Loxahatchee River.
- (2) Stormwater Treatment Area upstream of the Water Catchment Area may be needed.
- (3) Secondary structures (recharge canals) may be needed downstream of the Water Catchment Area to provide water to achieve the desired result.
- (4) Due to lack of long term storage (ASR) hydroperiod enhancements within the West Palm Beach Water Catchment Area are not being considered in the alternative.



Component L2

Geographic Region: Lower East Coast Service Area

Component Title: Change coastal wellfield operations (same as Alternative 1 with the exception of the City of Hollywood)

Purpose: Shift demands from eastern wellfields to western facilities away from the saltwater interface to reduce impact of salt water intrusion.

Operation: For coastal utilities in the Lower East Coast Service Area which are experiencing an increased threat of saltwater intrusion, demands will be shifted from the eastern facilities to the western facilities away from the saltwater interface. The volume shifted is dependent upon the degree of saltwater intrusion but is generally proportional to the increase in demands between the 1995 existing conditions and the 2050 future without project conditions unless otherwise noted.

Design: For this alternative the following utilities have a portion of their demands shifted inland and include Lake Worth, Lantana, Manalapan, Boca Raton, Hollywood (including water supply to Broward County 3B and 3C), Hallandale and Florida City. With the exception of Hollywood and Hallandale, the remaining utility's eastern demands are generally capped at withdrawal rates consistent with the Lower East Coast Water Supply Plan. The remaining demand for these utilities is met from their western facilities. In this alternative, the City of Hollywood's demand is met from the following sources: 1) the Floridan Aquifer (4 MGD), 2) Hollywood's western facilities (approximately 21 MGD as outlined in the LECWSP), 3) South Broward Regional Wellfield (approximately 10 MGD), and 4) demand supplied from Hollywood to Broward County 3B and 3C met from South Broward County Regional Wellfield. All of the City of Hallandale's demands are also met from South Broward County Regional Wellfield.

Location: Lower East Coast Service Area.

Counties: Broward, Dade and Palm Beach.

Assumptions and related considerations:

1) It is assumed that the western facilities of the individual utilities have sufficient capacity to meet the increased demands.

Component M1

Geographic Region: Water Preserve Area - Palm Beach County

Component Title: Site 1 Impoundment (Same as Alternative 1) – SEE COMPONENT MAP2

Purpose: Water supply storage reservoir to supplement water deliveries to the Hillsboro Canal during the dry-season.

Operation: The reservoir will be filled during the wet-season from excess water in Hillsboro Canal (backpumped). Water will be released back to Hillsboro Canal to help maintain canal stages during the dry-season. If water is not available in the reservoir, existing rules for water delivery to this region will be applied.

Design:

1660 acres with a maximum depth of 6 feet

Inflow pump capacity = 200 cfs

Outflow structure capacity = 100 cfs

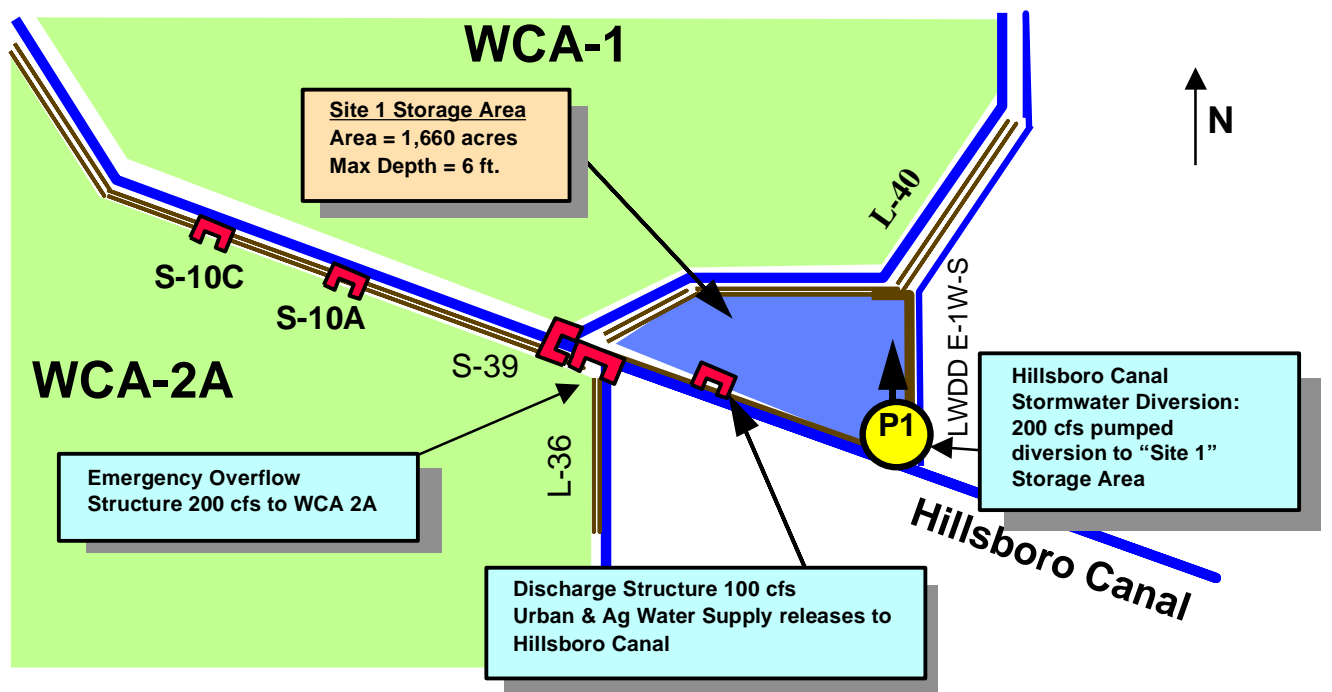
Emergency outflow structure = 200 cfs

Location: The Water Preserve Area Land Suitability Analysis previously identified 1660 acre site.

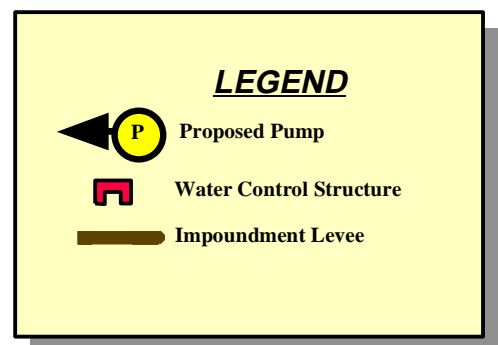
Counties: Palm Beach

Assumptions and related considerations:

(1) Excess storage could be discharged to Water Conservation Area 2A if a treatment facility could be added to meet Everglades' water quality standards.



Not to Scale



Alternative 2
Site 1 Impoundment
Component Map 2

Component N2

Geographic Region: Water Preserve Area - Broward County

Component Title: Water Conservation Area 2B Levee Seepage Management
(Modified from Alternative 1 to manage only the wet-season seepage and divert it to S-9) -- SEE COMPONENT MAP 3

Purpose: Seasonal seepage management along the eastern edge of Water Conservation Area 2B to reduce losses due to levee seepage to the Lower East Coast.

Operation: Reduction in levee seepage flow from Water Conservation Area 2B to the coastal area during the wet season (June-October) by pumping North New River south. (See Component P.)

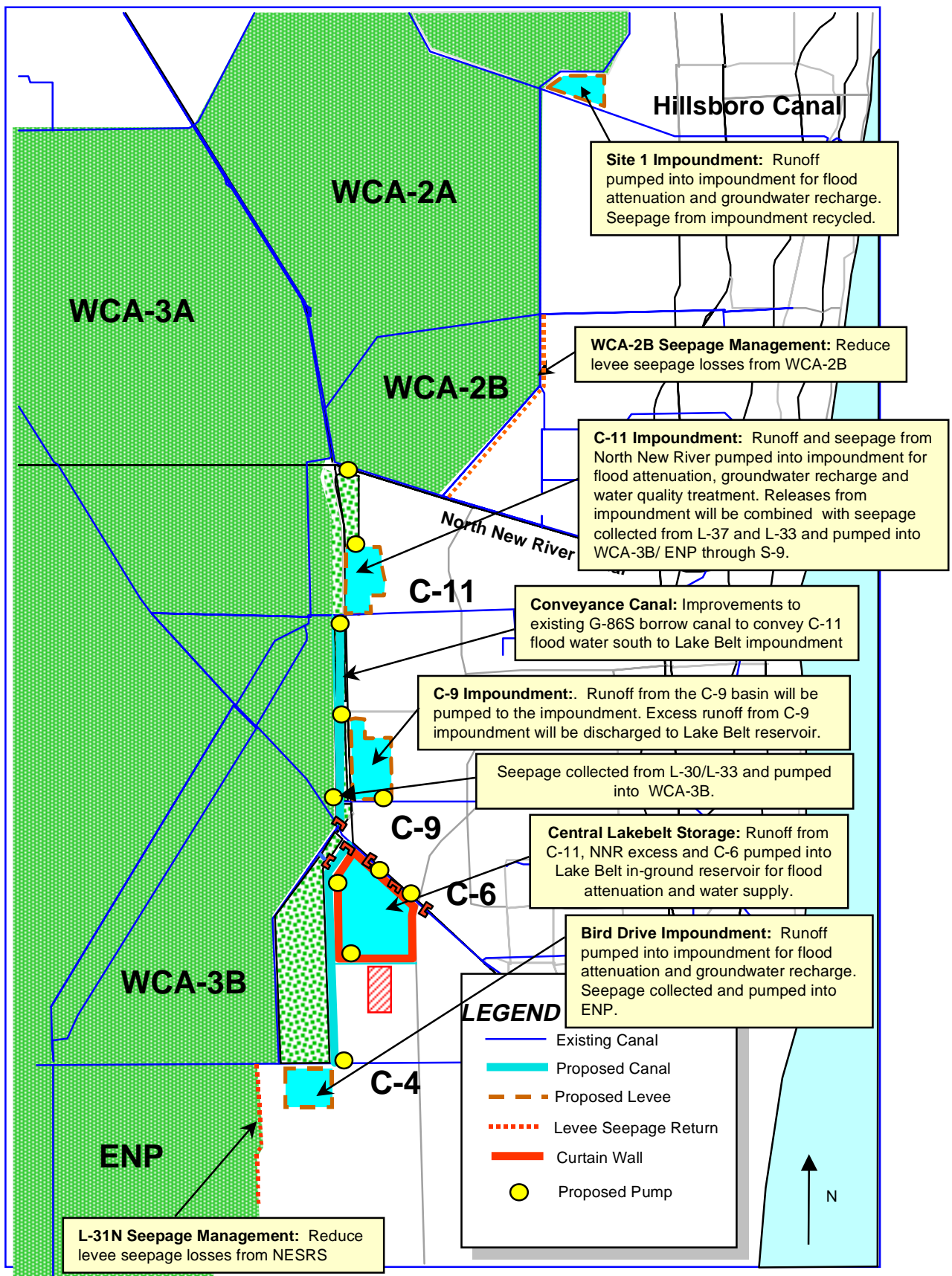
Design: Capture all levee seepage from L-35A borrow canal along Water Conservation Area 2B between S-124 to S-38A. Open S-124 during the wet season to pump all seepage south through Component P. During dry season close S-124 and only pump North New River.

Location: Along the existing eastern protective levee adjacent to Water Conservation Area 2B.

Counties: Broward

Assumptions and related considerations:

- (1) Seepage from Water Conservation Area 2B into North New River is addressed by North New River Water Preserve Area component.
- (2) Additional water retained in the regional system will be used to restore hydropatterns and water supply to the Lower East Coast.



Not to scale

General Water Preserve Area Components Alternative 2 Component Map 3

Component O1

Geographic Region: Water Preserve Area - Broward County

Component Title: Water Conservation Area 3A and 3B Levee Seepage Management (Same as Alternative 1) – SEE COMPONENT MAP 4

Purpose: Reduce seepage from Water Conservation Areas 3A and 3B to improve hydro patterns within the Conservation Areas by utilizing the marsh areas that are located east of the Water Conservation Areas and west of U.S. Highway 27. Allow higher water levels and longer inundation durations within those marshes. Seepage from the marshes will be collected and returned to the Water Conservation Areas to maintain flood protection. Serves to separate Water Conservation Area 3A seepage water from urban runoff originating in the C-11 Basin.

Operation: Seepage collected in the L-37 and L-33 borrow canals will continue to be backpumped through the existing S-9 pumping station. Seepage from the marsh areas will also be routed through the existing S-9 pumping station. Inflows from other sources will be diverted to storage.

Design: New levees will be constructed west of U.S. Highway 27 from the C-11 Canal to the C-6 Canal to separate seepage water from the urban runoff in the C-11 diversion canal (Component Q). Allow higher water levels in the marshes east of the Water Conservation Areas. A divide structure will be added to the C-11 canal west of Highway 27 to prevent drainage in the C-11 canal to be backpumped into Water Conservation Area 3A through the S-9 pumping station. Water from C-11 west will be diverted to the Central Lake Belt Storage component.

Location: Seepage collected in borrow canals along the existing eastern protective levee adjacent to Water Conservation Area 3A and 3B. Divide structure located in C-11 canal east of Highway 27.

Counties: Broward

Assumptions and related considerations:

(1) It is assumed that the seepage from the Water Conservation Areas meets water quality standards necessary to achieve ecosystem restoration.

Component P2

Geographic Region: Water Preserve Area - Broward County

Component Title: North New River Diversion Canal and Treatment Facility (Same as Alternative 1 with the exception of increased pump and structure capacities and seasonal S-141 operations)– SEE COMPONENT MAP 4

Purpose: Capture excess North New River and Water Conservation Area 2B water to store and treat in western C-11 Basin to be backpumped to Water Conservation Area 3A (1) to restore a portion of water deliveries to Water Conservation Area 3A that are eliminated by segregating the C-11 runoff from levee seepage and (2) to reduce stages above NSM in Water Conservation 2B and (3) to divert water through Water Conservation Area 3A and 3B to North East Shark River Slough. Western C-11 runoff that is presently backpumping untreated runoff into Water Conservation Area 3A will be released into the new canal and diverted to the Central Lake Belt Storage Area (see C-11 Diversion Canal component).

Operation: Western North New River water will be conveyed through a diversion canal adjacent to Highway 27 (east) to a water quality treatment facility north of C-11 for eventual backpumping to the Water Conservation Area 3A through the existing pump station S-9. Quantities from North New River that exceed the treatment facility capacity will be routed around the treatment facility to C-11. Outflows from the treatment facility can begin at 0.5 feet depth and will be made to the L-37 borrow canal and ultimately to Water Conservation Area 3A through S-9.

During the wet season (June through October) operate S-124 to direct eastern Water Conservation Area 2B levee seepage to the North New River to be pumped south (see Component N).

Additionally, operate S-141 to discharge 100 cfs from Water Conservation Area 2B through S-34 to North New River when Water Conservation Area 2B is above NSM levels.

Design:

- (1) 600 cfs diversion canal (east of Highway 27) between North New River and water quality treatment facility
- (2) Intermediate 600 cfs pump station in the diversion canal may be need
- (3) S-9 Water Quality Treatment Area
 - 1600 acres with a maximum depth of 4 feet
 - Inflow structure: 400 cfs pump (to be resized as needed)
 - Outflow structure: Gravity structure with 300 cfs capacity at 4 foot head.
 - Outflow Canal: 400 cfs between treatment area and L-37 borrow canal (under US 27)
- (4) 600 cfs bypass canal and water control structure upstream of C-11

(5) 100 cfs of S-141's 435 cfs capacity operated to lower stages in Water Conservation Area 2B when elevations are above NSM.

Location: The diversion canal is located east of US 27 between North New River Canal and the Water Quality Treatment facility. The Water Preserve Area Land Suitability Analysis identified site for the Water Quality Treatment facility. The site is located north of C-11 just east of US-27.

Counties: Broward

Component Q1

Geographic Region: Water Preserve Area - Broward County

Component Title: Western C-11 Diversion Canal -- to Central Lake Belt Storage (same as Alternative 1) – SEE COMPONENT MAP 4

Purpose: Divert untreated runoff from western C-11 that is presently discharged into Water Conservation Area 3A and excess flows from the North New River Canal and C-9, to the Central Lake Belt Reservoir.

Operation: All runoff in the western C-11 canal that is presently backpumped into Water Conservation Area 3A will be diverted to the Central Lake Belt Reservoir.

Design:

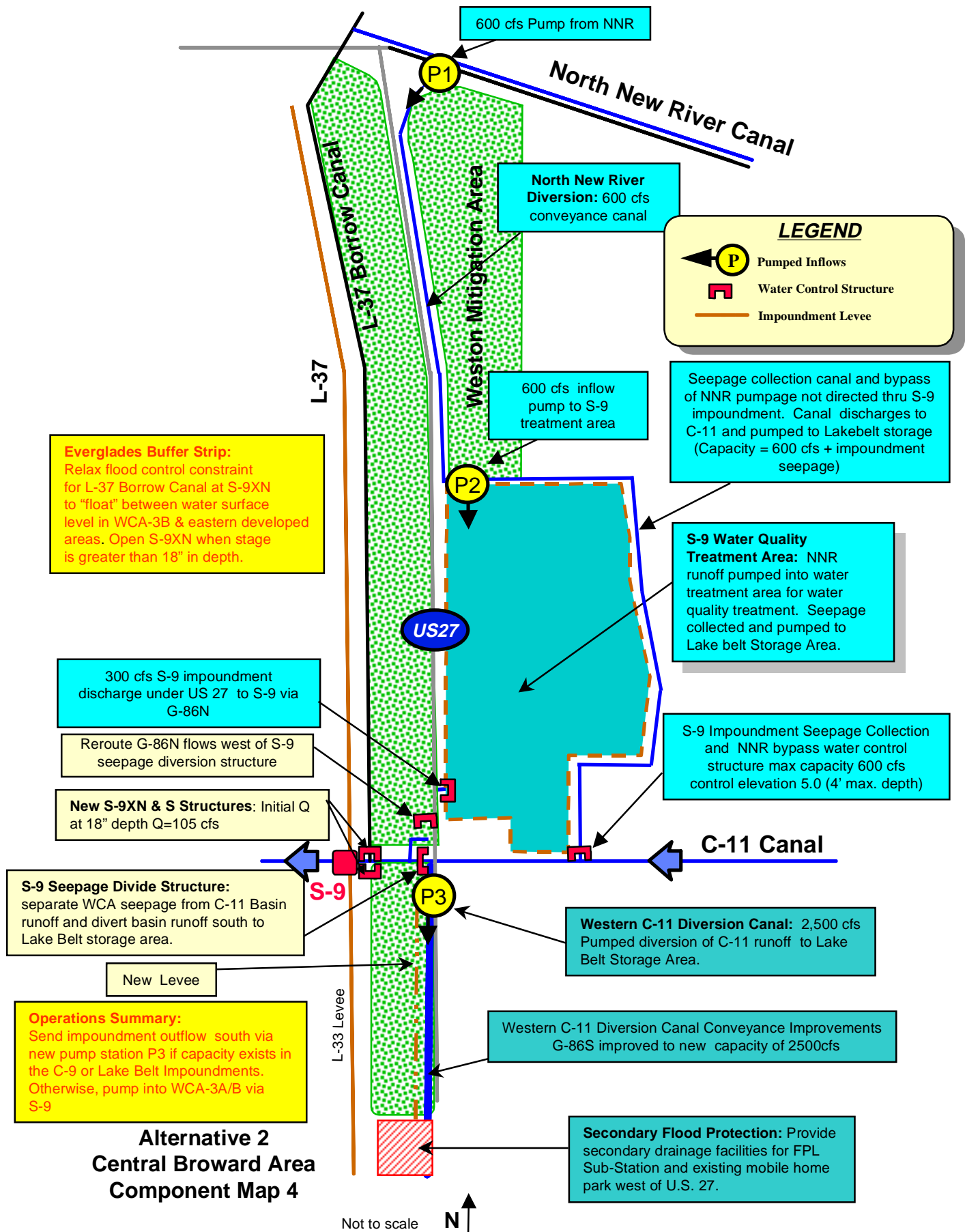
- (1) 2,500 cfs diversion canal west of U.S. 27 between C-11 and C-9 and a 2,500 cfs diversion canal between C-9 and the Central Lake Belt Storage
- (2) Intermediate 2,500 cfs pump station in the diversion canal south of C-11 may be needed

Location: The diversion canal is located west of US-27 between C-11 and the Central Lake Belt Reservoir

Counties: Broward, Dade

Assumptions and related considerations:

- (1) Flood protection component for FPL substation and mobile home park may be needed.



Component R1

Geographic Region: Water Preserve Area - Broward County

Component Title: C-9 Impoundment (same as Alternative 1) – SEE COMPONENT MAP 5

Purpose: Capture runoff from western C-9 basin by backpumping into the impoundment area. The facility will provide flood peak attenuation within the basin and groundwater recharge.

Operation: Runoff from western C-9 basin will be backpumped into the impoundment area. Excess water up to 500 cfs from the C-9 impoundment will be discharged south to the Lakebelt storage reservoir via a new conveyance canal. Discharges to Lake Belt reservoir will not occur below 1.5' in C-9 impoundment. Outflows are made back to C-9 as needed for water supply purposes. Seepage collected and returned to impoundment.

Design:

2,500 acres with a maximum depth of 4 feet

Inflow structure: 1500 cfs pump (to be resized as needed)

Outflow structure (water supply): Gravity structure with 300 cfs capacity at 4 foot head.

Outflow structure (Lake Belt Reservoir): Gravity structure with 500 cfs capacity at 4 foot head

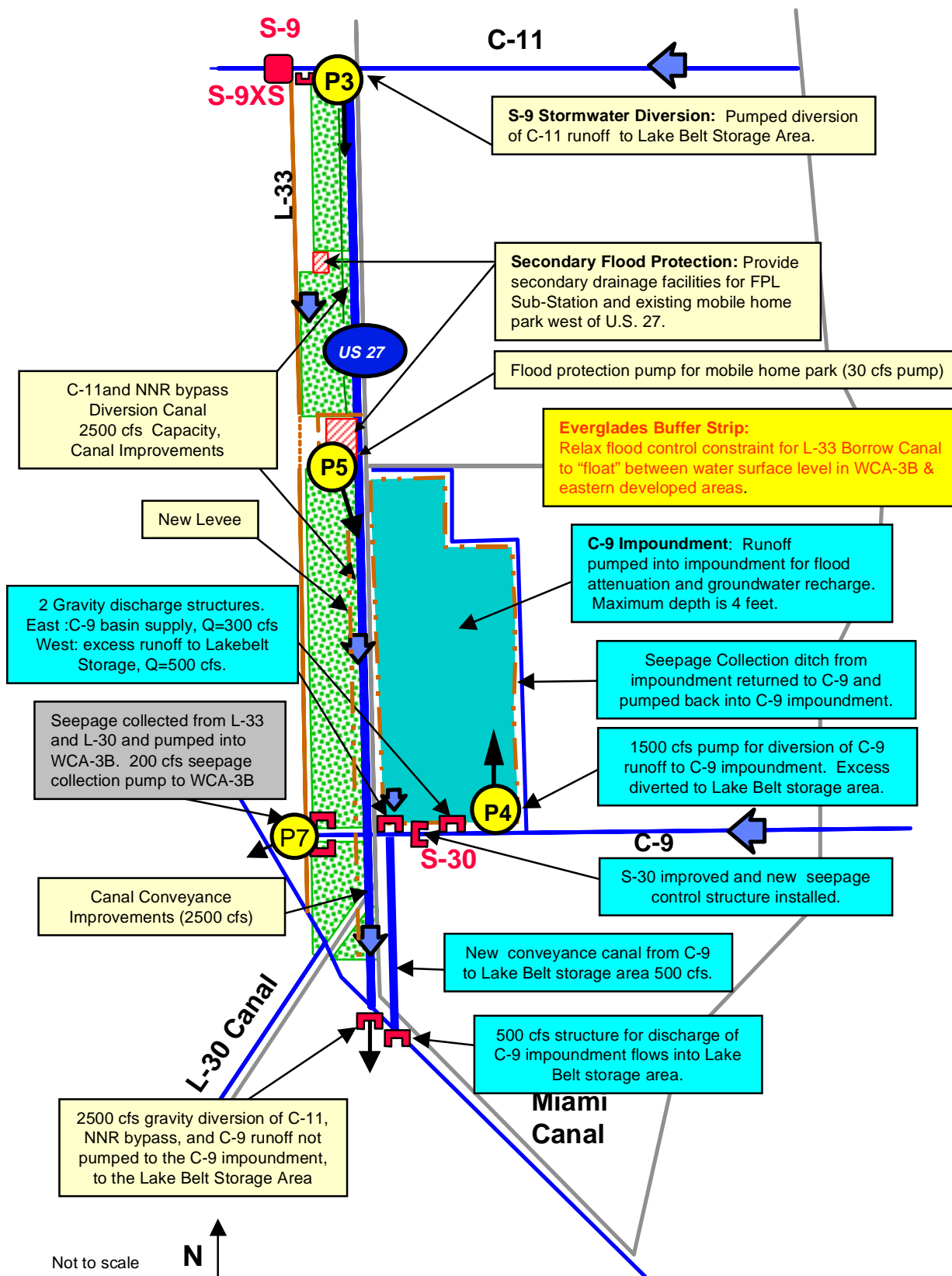
Divide structure assumed between the pump and gravity structure to prevent recycling.

Seepage Collection: 200 cfs recycled into the impoundment area

Location: Site identified by Water Preserve Area Land Suitability Analysis
Counties: Broward

Assumptions and related considerations:

(1) Treatment facility needed if stored water is backpumped into Water Conservation Area 3A.



**Alternative 2
S.W. Broward Area
Component Map 5**

Component S1

Geographic Region: Water Preserve Area - Dade County

Component Title: Central Lakebelt In-ground Storage Reservoir (Same as Alternative 1) – SEE COMPONENT MAP 6

Purpose: In-ground reservoir to capture a portion of runoff from western North New River, C-11, C-9 and C-6 Basins. The in-ground reservoir will allow storage of untreated runoff without concerns of ground water contamination. The stored water will be returned to canal system to maintain stages during the dry season.

Operation: Inflows from C-6 (west of the proposed divide structure), western C-11, and portions of runoff from North New River and C-9 basin runoff are both pumped and gravity fed into in-ground reservoir. Inflow ceases when stages reach ~5.0 feet, NGVD (0 feet above adjacent land elevation). Outflows for water supply are made to South Dade Canal System (via ~600 cfs pump to L-30) and Northwest wellfield protection canal (via a ~300 cfs pump). Supply from the reservoir can be withdrawn for stages down to -3.0 feet, NGVD (8 feet working storage & maximum head on seepage barrier). C-4 demands to be met from lake outflow via the Dade-Broward Levee seepage collection and water supply canal. Excess flow in Dade-Broward Levee seepage collection and water supply canal to be discharged into C-4 and pumped into North East Shark River Slough via S-356 (if C-4 stages are favorable).

Design:

~10,000 acres with subterranean seepage barrier around perimeter to enable drawdown during dry periods and to prevent water quality impacts to the northwest Dade wellfield.

Inflow Structures: 2500 cfs gravity structure

Outflow Structures: 600 cfs pump to L-30 for deliveries to South Dade

Conveyance system:

300 cfs pump to North West wellfield protection canal

300 cfs pump to C-6

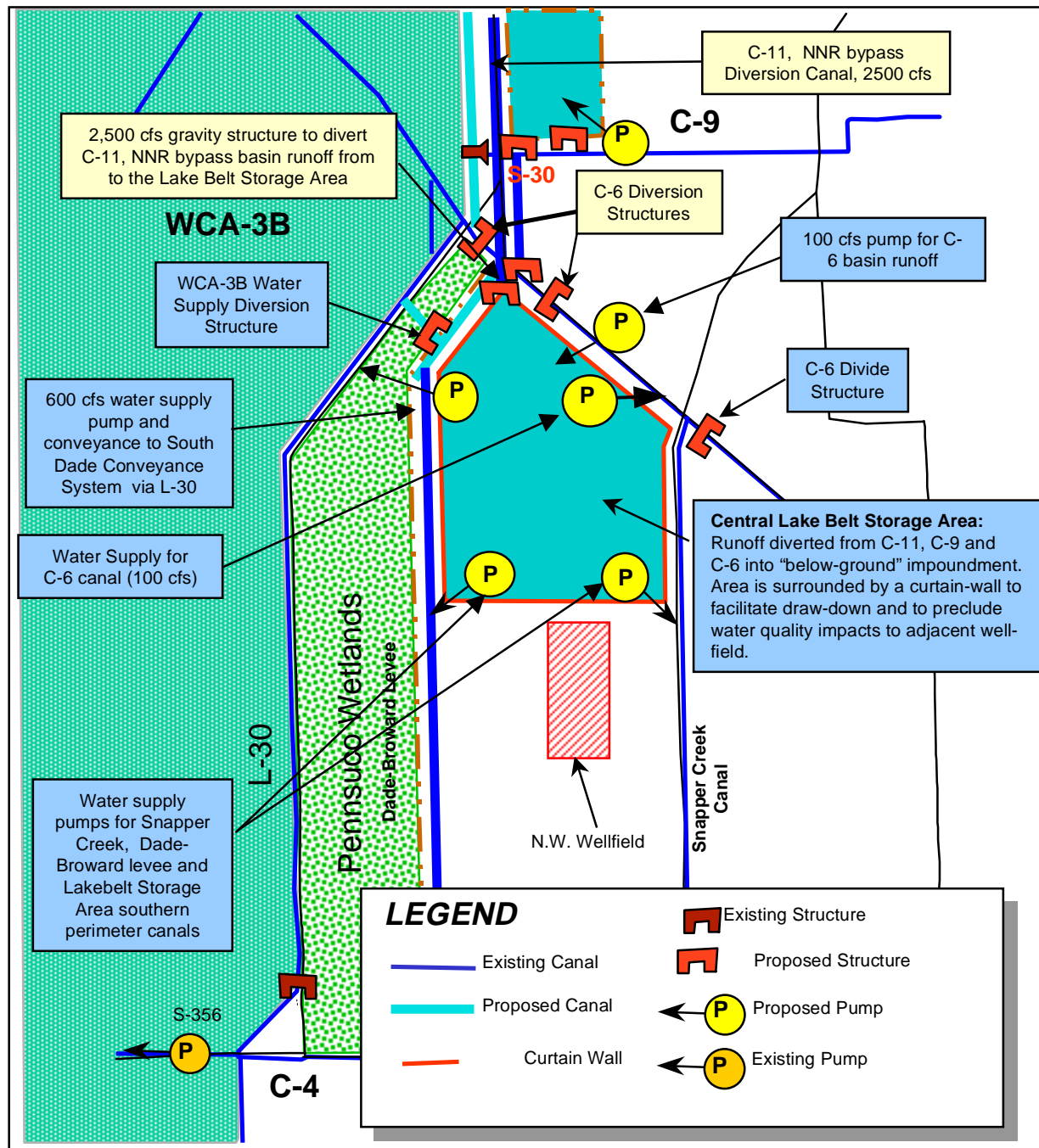
Location: Reservoir would be within the area proposed for rock mining by the Lakebelt Issue Team. It would be sited south of Miami Canal (C-6) and North of the NW Dade County wellfield to minimize impacts to the wellfield and between Pennsuco wetlands and Snapper Creek.

Counties: Dade

Assumptions and related considerations:

- (1) No adverse effect of a subterranean wall on Dade County's NW wellfield.
- (2) Treatment facility needed if stored water is backpumped to the Everglades.
- (3) All water quality considerations will be addressed regarding releases from the reservoir to the water supply wellfields.

- (4) Impacts on the cone of influence of the Northwest Wellfield and its effect on wetland mitigation around the wellfield.



Alternative 2
Central Lake Belt Storage
Component Map 6

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Component T1

Geographic Region: Water Preserve Area – Dade County

Component Title: C-4 Structure

Purpose: Proposed structure would control water levels in the C-4 Canal at higher elevation to reduce seepage losses from the Pennsuco Wetlands and areas to the west of the structure located just downstream of the Dade-Broward Levee on C-4.

Operation: The structure would maintain water levels at 6.5 feet NGVD for seepage control purposes and be capable of passing flood flows with a minimum of head loss and supplying water to the C-4 basin to meet demands.

Design: Operable Lift-gate with 6.5 feet NGVD overflow and approximately 400 cfs capacity (final design specifications will be determined in detailed design and hydrologic and hydraulic modeling in the future).

Location: Just downstream of the Dade-Broward Levee on C-4 Canal.

Assumptions and related considerations:

- (1) Benefits to WCA-3B associated with improved C-4 seepage control are directly related to the proposed G-356 pumpage (Modified Water Deliveries).
- (2) Head losses across the Proposed Structure will not inhibit passing flood releases when necessary.
- (3) A pump may be associated with this structure if back pumping the C-4 basin runoff to the Bird Drive storage area becomes a component of the final alternative.

Component U2

Geographic Region: Water Preserve Area - Dade County

Component Title: Bird Drive Basin Impoundment (Same as Alternative with the exception of operational rules for the C-4 downstream diversion structure) -- SEE COMPONENT MAP 7

Purpose: Capture runoff from western C-4 basin and divert low flows from Modified Water Deliveries Project pump station S-356 to the impoundment area. The facility will provide C-4 flood peak attenuation within the basin improve water quality into Everglades National Park and enhance groundwater recharge.

Operation: Inflows from western C-4 basin and low flows diverted from the S-356 water budget through the S-336 structure to be pumped into proposed impoundment area to provide flood peak attenuation and groundwater recharge. C-4 runoff in excess of 600 cfs pump capacity to be discharged eastward. Outflows will be used to meet C-4 needs. Seepage outflows will be released to L-31N and pumped to Northeast Shark River Slough via S-356 (if C-4 stages are favorable). Main change in this alternative is the operation of the C-4 downstream diversion structure. This structure shall be closed in the dry season except to allow regional water to be brought in to maintain S-25B. During the wet season the structure should be opened but also allow for capture of western C-4 basin water by the reservoir and diversion of excess through the C-2 canal.

Design:

2,877 acres with a maximum depth of 4 feet

Inflow structure: 600 cfs pump (to be resized as needed)

100 cfs pump for low flows from L-31N (Modified Water Deliveries) to Bird Drive impoundment

Outflow structure:

Water supply: Gravity structure with 200 cfs capacity at 4 foot head.

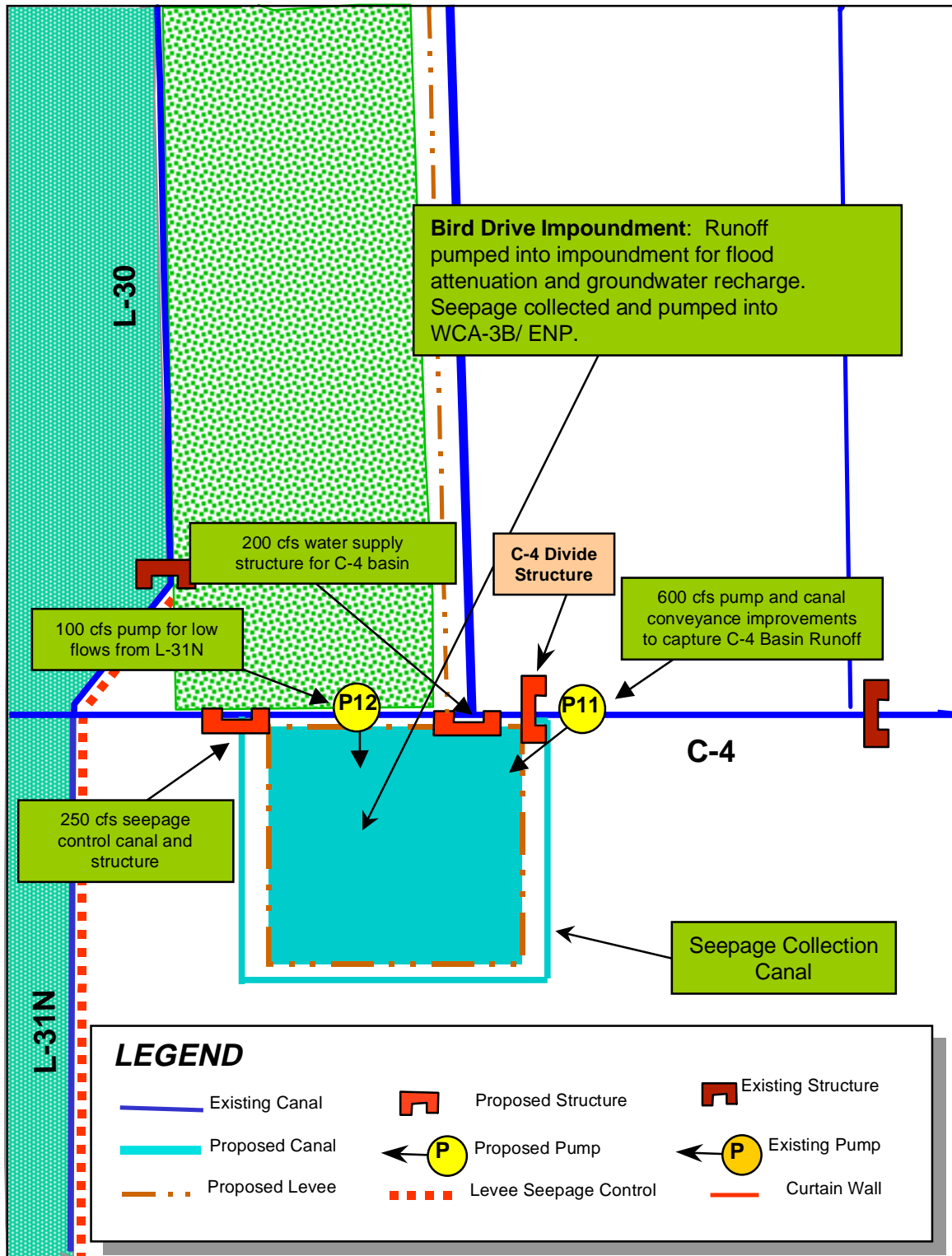
Seepage: Gravity structure with 250 cfs capacity.

Location: Northwestern 4 sections in Bird Drive basin. This site was identified during the Water Preserve Area Land Suitability Analysis.

Counties: Dade

Assumptions and related considerations:

(1) Treatment facility needed if stored water is backpumped to the Everglades.



Alternative 2
Bird Drive Basin
Component Map 7

Not to Scale



Component V2

Geographic Region: Water Preserve Area - Dade County

Component Title: L-31N Levee Improvements for Seepage Management
(Modified from Alternative 1 to further reduce seepage in wet-season) – SEE
COMPONENT MAP 7

Purpose: Levee seepage management along the eastern edge (L-31N) of Everglades National Park to eliminate losses due to levee seepage to the East Coast. An additional feature has been added to reduce all wet-season seepage/ground water flows to the east. Feature will help restore hydropatterns in Everglades National Park.

Operation: 100% reduction in levee seepage flow from Everglades National Park year-round. Further, 100% reduction in all groundwater flows during the wet-season. Bird Drive Basin and Lakebelt storage facility will be used to recharge aquifers to the east.

Design:

Levee Seepage: Sheet pile or coring material will penetrate the L-31N levee and a portion of the aquifer to retard seepage between Tamiami Trail to the 8.5 square mile area.

Wet-Season Ground Water Seepage: Distributed ground water wells adjacent to L-31N and return flows to Everglades National Park.

If needed, aquifer recharge will occur from deliveries from Bird Drive Basin and Lakebelt storage facilities.

Location: Along the existing eastern protective levee (L-31N) adjacent to Everglades National Park.

Counties: Dade

Component W2

Geographic Region: Taylor Creek/Nubbin Slough

Component Title: Taylor Creek/Nubbin Slough Storage and Treatment Area

Purpose: Storage reservoir to provide flood protection, water quality treatment, estuary protection and water supply benefits.

Operation: Local runoff from the Taylor Creek/Nubbin Slough basins to be pumped into a 5,000-acre reservoir and then into a 5,000-acre stormwater treatment area. The stormwater treatment area will reduce phosphorus concentrations in the runoff from approximately 0.528 mg/l to 0.107 mg/l. Treated water will then be pumped into Lake Okeechobee when the lake stage is falling and is at least 0.5 feet below the bottom pulse release zone.

Design:

Storage Reservoir:

5,000-acres at 10 feet maximum depth

Inflow pump capacity 2,500 cfs

Outflow pump capacity 1,000 cfs

Stormwater Treatment Area:

5,000-acres at 4 feet maximum depth

Inflow pump capacity 1,000 cfs (same structure as reservoir outflow)

Outflow pump capacity 1,000 cfs

Location:

Counties: Okeechobee, St. Lucie

Assumptions and related considerations:

- (1) Uncertainty in land availability.
- (2) Potential increase in stage duration of Lake Okeechobee.
- (3) Potential decrease in maximum stages of Lake Okeechobee.
- (4) Phosphorus inflow concentrations (flow-weighted) for the Taylor Creek (S-191) and Nubbin Slough (S-133) Basins obtained from 5-year rolling averages (1991-1995).
- (5) Average annual discharge rates determined from the period of record 1965-1990.

Component X2

Geographic Region: Water Preserve Area – Palm Beach County

Component Title: C-17 Backpumping

Purpose: Reduce water supply restrictions in Northern Palm Beach County Service Area by providing additional flows from the C-17 Basin to the West Palm Beach Water Catchment Area and enhance hydroperiods in the Loxahatchee Slough.

Operation: Capture excess C-17 canal water to meet urban water supply demands in North Palm Beach Service Area. Water would be diverted through the M-Canal to a stormwater treatment area and ultimately to the West Palm Beach Water Catchment Area.

Design: 350 cfs pump on the C-17 canal north of its intersection with the M-Canal

- 200 cfs pump on the east branch of the C-17 canal
- 300 cfs pump in the M-Canal west of Haverhill Road to lift flows over existing gravity structure
- 308 acre stormwater treatment area at 4 feet maximum depth
- 150 cfs gravity discharge structure into West Palm Beach Water Catchment Area
- Improve M-Canal capacity

Location: 308 acres located east of the West Palm Beach Water Catchment Area.
Counties: Palm Beach

Assumptions and related considerations:

- (1) Water quality of C-17 water similar to C-51 water quality
- (2) Location of stormwater treatment area south of existing landfill
- (3) Pump class 3 water into class 1 canal

Component Y2

Geographic Region: Water Catchment Area – Palm Beach County

Component Title: C-51 Backpumping to Water Catchment Area

Purpose: Reduce water supply restrictions in Northern Palm Beach County Service Area by providing additional flows from the C-51 West Basin to the West Palm Beach Water Catchment Area and enhance hydroperiods in Loxahatchee Slough.

Operation: Capture excess C-51 canal water to meet urban water supply demands in the North Palm Beach County Service Area. Water would be diverted from C-51 to a water treatment area and then into the Water Catchment Area.

Design: 1800 acres at 4 feet maximum depth to be used for stormwater treatment. Relocate the S-155A structure east of the intersection of Lake Worth Drainage District's E-1 Canal and the C-51 Canal and increase the capacity of S-155A from 1000 cfs to 1450 cfs.

Improve conveyance between C-51 and the stormwater treatment area as necessary.

450 cfs inflow pump to stormwater treatment area.

450 cfs gravity discharge structure into West Palm Beach Water Catchment Area.

Location: 1800 acres located southeast of West Palm Beach Water Catchment Area.

Counties: Palm Beach

Assumptions and related considerations:

(1) Uncertainty in land availability.

(2) Connection of L-8 and C-51 Basins.

Component AA2

Geographic Region: Central and Southern Everglades, Water Conservation Areas and Everglades National Park

Component Title: Additional S-345 structures.

Purpose: The compartmentalization of the Water Conservation Areas has contributed to the loss of historic overland flows of the central Everglades slough system. This alteration of flows has resulted in temporal changes in hydropatterns and hydroperiods in the historic deepwater, central axis of the Shark Slough system. This component adds conveyance to Water Conservation Area 3B to help in re-establishing NSM-like hydroperiods and hydropatterns and the historical flow distribution across Tamiami Trail.

Operation: The addition of a North East Shark River Slough rainfall trigger well and modification of western Shark Slough basin rainfall triggers deliver additional flows to the basin. Modification of L-67A decreases downstream conveyance to the S-12's required to promote surface water flows to Water Conservation Area 3B and to North East Shark River Slough.

Design: Increase in the total discharge capacity of S-345's to 7500 cfs and the addition of associated plugs (S-349's).

Location: The additional 3-1250 cfs structures and plugs are to be spaced evenly along the length of L-67A with respect to the existing structures.

Assumptions and related concerns: The emphasis is in re-establishing the historic persistent, deep-water slough that existed in Water Conservation Area 3B and North East Shark River Slough.

Component BB1

Geographic Region: Water Preserve Area - Palm Beach County

Component Title: Dade Broward Levee / Pennsuco Wetlands -- SEE COMPONENT MAP 8

Purpose: Reduce seepage to the east from the Pennsuco wetlands and southern Water Conservation Area-3B and enhance hydroperiods in the Pennsuco. Also an improved Dade Broward Levee will enhance recharge Dade County's NW wellfield

Operation: Improvements to the Dade-Broward Levee and associated conveyance system will reduce seepage losses to the east and provide recharge to Dade County's Northwest Wellfield. Seepage reduction will enhance hydroperiods in Pennsuco wetlands and hold stage higher along southeastern WCA-3B. Recharging the conveyance features of the Dade-Broward levee from the Central Lakebelt In-ground Storage Reservoir (see component S1) provides recharge to Dade County's Northwest Wellfield. Treatment areas will be provided to meet all water quality standards required for release from the Central Lakebelt Reservoir if necessary.

Design:

Improve the Dade-Broward Levee:

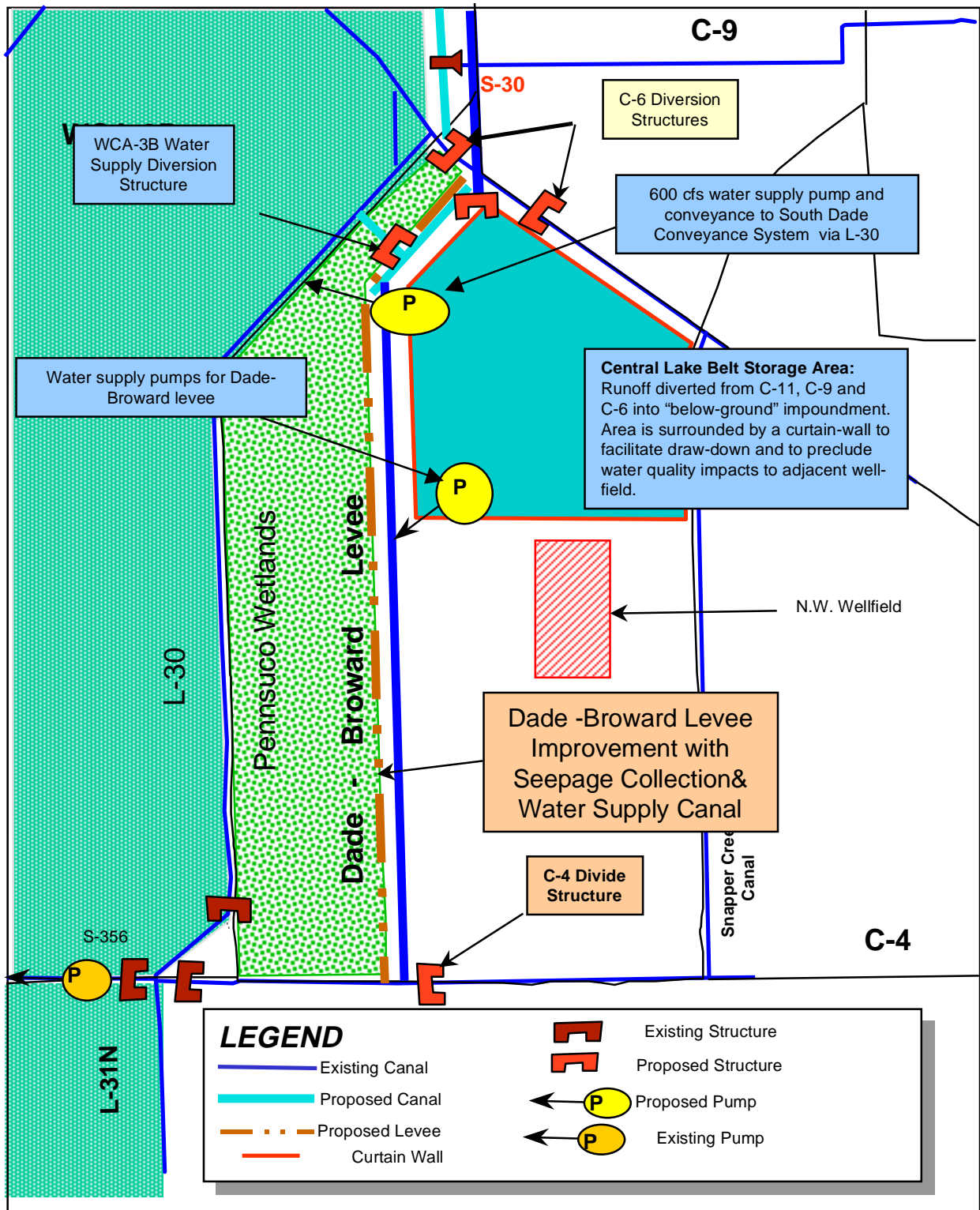
- Construct or improve existing levee to five-foot height with 2-foot top width while creating or improving existing conveyance to a capacity of up to 300 cfs.
- Provide recharge for the Dade-Broward Levee conveyance system from the Central Lakebelt In-ground Storage Area when the Conveyance Channel is below 6.0 feet NGVD at the C-4 structure located at the southern end of the Dade-Broward Levee.

Location: Dade-Broward Levee, Pennsuco Wetlands, WCA-3B, the Central Lakebelt Reservoir and Dade County's Northwest Wellfield.

Counties: Dade

Assumptions and related considerations:

- (1) Wellfield protection must be maintain through recharge of acceptable water quality.
- (2) Stormwater Treatment Area of the recharge provided from the Central Lakebelt Storage Reservoir may be needed.
- (3) Secondary structures within the recharge canals may be needed to provide seepage reduction and wellfield recharge desired.
- (4) The stage maintained in the Dade-Broward Levee conveyance is subject to change.



**Alternative 2
Dade-Broward Levee
Component Map 8**

N
↑
Not to Scale

Component CC2

Geographic Region: Lower East Coast Service Area

Component Title: Broward County Secondary Canal System

Purpose: Increase pump capacity of existing facilities (in the 2050 Base Case) for the Broward County Secondary Canal System to provide additional recharge to wellfields located in central coastal Broward County. Existing capacities of the pumps appear to be limiting maintenance of coastal canal levels. These facilities will be designed for water supply benefits and some capture of excessive storm water discharges to tide. Also need to improve canal conveyance in the C-13 canal between S-36 and Water Conservation Area 2B.

Operation: When excess water is available in the basin, water is pumped into coastal canal system to maintain canal stages. When local basin water is not sufficient to maintain canal stages, continue to bring water in from the regional system to maintain stages as done in the 2050 base case.

Design:

Canal Conveyance: Increase canal conveyance to allow sufficient water to move to coastal pump station.

Pump Capacities: Increase pump capacities in the Broward Secondary Canal System from the existing 33 cfs to 100 cfs per pump. Specific pumps to increase capacity are P-2 and P-3.

Location: C-13 canal.

Counties: Broward

Assumptions and related considerations:

- 1) Water supply from Water Conservation Area 2B seepage contingent upon Water Conservation Area 2B Levee Seepage Management Component N.
- 2) When water supply is not available from WCA-2B, water is augmented from other regional sources.

Component DD2

Geographic Region: Holey Land Wildlife Management Area

Component Title: Revised Holey Land Operational Plan – SEE COMPONENT FIGURE 1

Purpose: An operational plan designed to maintain a water level regime that will restore Everglades habitat and protect wildlife communities within the Holey Land Wildlife Management Area.

Operation: The proposed operational plan for the Holey Land is based on current conditions. Until cleaner water is available, the G-200A inflow pump station will utilize runoff from the Miami Canal to maintain stage in the Holey Land in accordance to the schedule shown. Water levels will be maintained at 10.75 feet msl from April 15 to June 15, when they will rise linearly to 12.0 feet msl on October 31. From this date water levels will fall linearly to 10.75 feet on April 15. The operational plan also includes maintaining a minimum groundwater elevation to reduce the frequency of severe muck fires that cause soil subsidence and damage to wildlife habitat.

Design: Operational change only. Replace rainfall-driven water deliveries to the Holey Land and substitute the proposed operational plan.

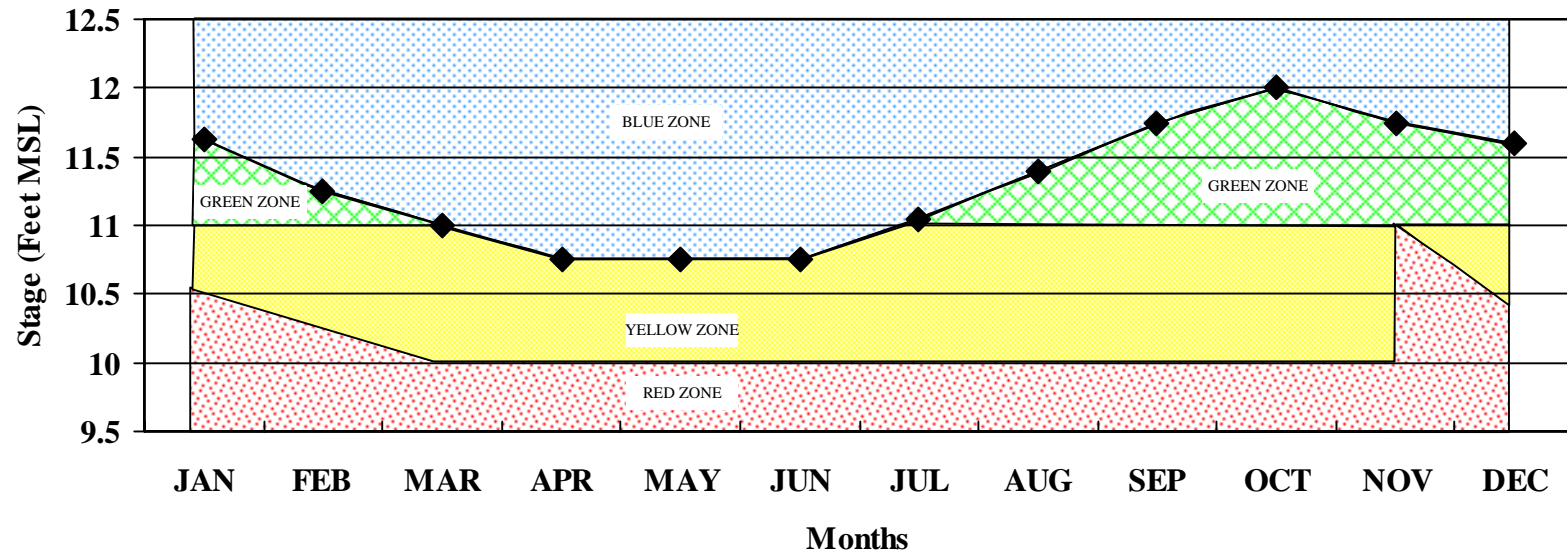
Location: Southern portion of the Everglades Agricultural Area, north of Water Conservation Area 3A.

Counties: Palm Beach

Assumptions and related considerations:

1) Water deliveries made to the Holey Land through G-200A are assumed to be of acceptable water quality from either Rotenberger or Lake Okeechobee.

FIGURE 1. HOLEY LAND WILDLIFE MANAGEMENT AREA OPERATIONAL SCHEDULE (G203D GAUGE)



- ◆—◆ Regulation Schedule
- BLUE ZONE: Pump into Holey Land only in emergency situations. Contact GFC next business day.
- GREEN ZONE: If Holey Land is below schedule, pump into the area from S-8 Basin.
- YELLOW ZONE: Pump into Holey Land from 1) S-8 Basin or 2) Lake Okeechobee at discretion of SFWMD Director of Operations if Lake Okeechobee is above the WATCH line.
- RED ZONE: If Lake Okeechobee is above the Watch line, releases will be made into Holey Land.